AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) An acoustic mirror type thin film bulk acoustic resonator comprising:

a substrate;

an acoustic mirror layer disposed on the substrate, the acoustic mirror layer including a plurality of impedance layers alternately having a high acoustic impedance and a low acoustic impedance; and

a piezoelectric thin film vibrator disposed on the acoustic mirror layer, the piezoelectric thin film vibrator including a lower electrode, a piezoelectric thin film and an upper electrode,

wherein an uppermost impedance layer of the plurality of impedance layers contacts the lower electrode of the of the piezoelectric thin film vibrator,

wherein the uppermost impedance layer contacting the lower electrode is a low acoustic impedance layer,

wherein the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode,

wherein a sum of a thickness of the lower electrode and a thickness of the upper electrode is between 5% and 60% of a thickness of the piezoelectric thin film vibrator, ~~and~~

wherein the thickness of the lower electrode is larger than the thickness of the upper electrode, and

wherein a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the

acoustic mirror type thin film bulk acoustic resonator.

Claim 2 (Previously Presented) The thin film bulk acoustic resonator according to claim 1, wherein:

the plurality of impedance layers includes a plurality of low acoustic impedance layers and a plurality of high acoustic impedance layers which are alternately disposed; and

an uppermost one of the low acoustic impedance layers which contacts the lower electrode, has a thickness of one fourth of an acoustic wavelength defined from a resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 3 (Previously Presented) The thin film bulk acoustic resonator according to claim 2, wherein each of the plurality of low acoustic impedance layers has a thickness of one fourth of the acoustic wavelength defined from the resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 4 (Previously Presented) The thin film bulk acoustic resonator according to claim 1, wherein:

the plurality of impedance layers includes a plurality of low acoustic impedance layers and a plurality of high acoustic impedance layers which are alternately disposed; and

an uppermost one of the low acoustic impedance layers which contacts the lower electrode, has a thickness of less than one fourth of an acoustic wavelength defined from a resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 5 (Previously Presented) The thin film bulk acoustic resonator according to claim 4, wherein each of the plurality of low acoustic impedance layers has a thickness of less than one fourth of the acoustic wavelength defined from the resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 6 (Previously Presented) The thin film bulk acoustic resonator according to claim 1, wherein:

the plurality of impedance layers includes a plurality of low acoustic impedance layers and a plurality of high acoustic impedance layers which are alternately disposed; and

an uppermost one of the low acoustic impedance layers which contacts the lower electrode, has a thickness of more than one fourth of an acoustic wavelength defined from a resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 7 (Previously Presented) The thin film bulk acoustic resonator according to claim 6, wherein each of the plurality of low acoustic impedance layers has a thickness of more than one fourth of the acoustic wavelength defined from the resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 8 (Previously Presented) The thin film bulk acoustic resonator according to claim 1, wherein:

the plurality of impedance layers includes a plurality of low acoustic impedance layers and a plurality of high acoustic impedance layers which are alternately disposed;

at least an uppermost one of the plurality of low acoustic impedance layer, has a thickness different from one fourth of an acoustic wavelength defined from a resonant frequency in free space of the piezoelectric thin film vibrator; and

an uppermost one of the high acoustic impedance layers has a thickness different from one fourth of the acoustic wavelength defined from the resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 9 (Previously Presented) The thin film bulk acoustic resonator according to claim 8, wherein each of the plurality of high acoustic impedance layers has a thickness different from one fourth of the acoustic wavelength defined from the resonant frequency in free space of the piezoelectric thin film vibrator.

Claim 10 (Currently Amended) A filter comprising two or more thin film bulk acoustic resonators which are connected in a ladder form, wherein

at least one of the thin film bulk acoustic resonators comprises:

a substrate;

an acoustic mirror layer disposed on the substrate, the acoustic mirror layer including a plurality of impedance layers alternately having a high acoustic impedance and a low acoustic impedance; and

a piezoelectric thin film vibrator disposed on the acoustic mirror layer, the piezoelectric thin film vibrator including a lower electrode, a piezoelectric thin film and an upper electrode,

wherein an uppermost impedance layer of the plurality of impedance layers contacts the lower electrode of the of the piezoelectric thin film vibrator,

wherein the uppermost impedance layer contacting the lower electrode is a low acoustic impedance layer,

wherein the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode,

wherein a sum of a thickness of the lower electrode and a thickness of the upper electrode is between 5% and 60% of a thickness of the piezoelectric thin film vibrator, ~~and~~

wherein the thickness of the lower electrode is larger than the thickness of the upper electrode, and

wherein a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the at least one of the thin film bulk acoustic resonators.

Claim 11 (Currently Amended) A duplexer comprising a transmission filter and a reception filter, wherein:

at least one of the transmission filter and the reception filter comprises two or more thin film bulk acoustic resonators which are connected in a ladder form; and

at least one of the thin film bulk acoustic resonators comprises:

a substrate;

an acoustic mirror layer disposed on the substrate, the acoustic mirror layer including a plurality of impedance layers alternately having a high acoustic impedance and a low

acoustic impedance; and

a piezoelectric thin film vibrator disposed on the acoustic mirror layer, the piezoelectric thin film vibrator including a lower electrode, a piezoelectric thin film and an upper electrode,

wherein an uppermost impedance layer of the plurality of impedance layers contacts the lower electrode of the of the piezoelectric thin film vibrator,

wherein the uppermost impedance layer contacting the lower electrode is a low acoustic impedance layer,

wherein the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode,

wherein a sum of a thickness of the lower electrode and a thickness of the upper electrode is between 5% and 60% of a thickness of the piezoelectric thin film vibrator, ~~and~~

wherein the thickness of the lower electrode is larger than the thickness of the upper electrode, and

wherein a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the at least one of the thin film bulk acoustic resonators.

Claim 12 (Currently Amended) A communication apparatus comprising at least one thin film bulk acoustic resonator, wherein

the at least one thin film bulk acoustic resonators comprises:

a substrate;

an acoustic mirror layer disposed on the substrate, the acoustic mirror layer including a plurality of impedance layers alternately having a high acoustic impedance and a low acoustic impedance; and

a piezoelectric thin film vibrator disposed on the acoustic mirror layer, the piezoelectric thin film vibrator including a lower electrode, a piezoelectric thin film and an upper electrode,

wherein an uppermost impedance layer of the plurality of impedance layers contacts the lower electrode of the of the piezoelectric thin film vibrator,

wherein the uppermost impedance layer contacting the lower electrode is a low acoustic impedance layer,

wherein the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode,

wherein a sum of a thickness of the lower electrode and a thickness of the upper electrode is between 5% and 60% of a thickness of the piezoelectric thin film vibrator, ~~and~~

wherein the thickness of the lower electrode is larger than the thickness of the upper electrode, and

wherein a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the at least one of the thin film bulk acoustic resonators.